

WHAT IS CLAIMED IS:

1. A method of inspecting a selected workpiece during a production run in which workpieces are supplied to a plurality of workstations, said method

5 comprising the steps of:

- (a.) performing a control routine that controls the movement of the workpieces to and from the workstations, said control routine operating in a series of cycles;
- 10 (b.) generating a signal requesting the selected workpiece from a selected one of the workstations;
- (c.) in response to the signal, interrupting the performance of the control routine at the end of the then current cycle and moving the selected workpiece from the selected one of the workstations to a quality control station;
- 15 (d.) resuming the performance of the control routine;
- (e.) inspecting the selected workpiece after step (d);
- (f.) determining whether the selected workpiece is acceptable;
- (g.) if the selected workpiece is acceptable, generating a second signal indicating that the selected workpiece is ready to be transported to
- 20 an output area; and
- (h.) in response to the second signal, interrupting the control routine at the end of the then current cycle and moving the selected workpiece from the quality control station to the output area.

25 2. The method of claim 1, further comprising the steps of:

- (i.) if the selected workpiece is not acceptable, generating a third signal indicating that the selected workpiece is ready to be transported to a desired one of the workstations; and
- 30 (j.) in response to the third signal, interrupting the control routine at the end of the then current cycle and moving the selected workpiece

from the quality control station to said desired one of the workstations.

3. The method of claim 2, wherein the desired one of the workstations is
5 the selected one of the workstations.

4. The method of claim 2, further comprising the step of:
(k.) informing the control routine that workpieces should not be
delivered to the selected one of the workstations; and
10 wherein step (k.) is performed between steps (c.) and (d.).

5. The method of claim 4, wherein step (k.) is performed by placing the selected one of the workstations in a bypass mode.

15 6. The method of claim 4, further comprising the step of:
(l.) stamping the workpiece with a stamp indicating that the selected one of the workstations worked on the workpiece; and
wherein step (l.) is performed after step (h.),

20 7. The method of claim 6, further comprising the step of:
(m.) informing the control routine that workpieces can be delivered to the selected one of the workstations; and
wherein step (m.) is performed after step (l.).

25 8. The method of claim 1, wherein the workstations are operable to generate and transmit call signals, and the control routine is operable to receive said call signals; and
wherein the performance of the control routine causes the workpieces to be supplied to the workstations based on the chronological order of the control
30 routine's receipt of the call signals from the workstations, whereby the

workstation that transmits the first received call signal is supplied with a workpiece first.

5 9. The method of claim 1, wherein step (e) is performed on a stand alone jig, outside the quality control station.

10 10. The method of claim 1, wherein the workpieces are automotive crankshafts.

11. The method of claim 1, wherein the control routine is performed by a programmable logic controller.

12. The method of claim 1, wherein the workpieces are moved to and from the workstations by an autoloader comprising a carriage movably mounted to a guidance structure.

13. The method of claim 1, wherein the control routine is predetermined.

14. A method of inspecting a first workpiece during a production run in which workpieces are supplied to a plurality of workstations with an autoloader comprising a carriage movably mounted to a guidance structure, said method comprising the steps of:

- (a.) moving the first workpiece from an input area to a first workstation using the autoloader;
- 25 (b.) moving the first workpiece from the first workstation to a quality control station using the autoloader;
- (c.) inspecting the first workpiece after step (b.);
- (d.) after step (b.), moving a second workpiece from the input area to a second workstation using the autoloader;
- 30 (e.) determining whether the first workpiece is acceptable; and

(f.) if the first workpiece is acceptable, moving the first workpiece from the quality control station to an output area using the autoloader.

15. The method of claim 14, further comprising the step of:

5 (g.) if the first workpiece is not acceptable, moving the first workpiece from the quality control station to a third workstation using the autoloader.

16. The method of claim 15, further comprising the step of:

10 (h.) stamping the first workpiece with a stamp indicating that the first workstation worked on the first workpiece; and wherein step (h.) is performed after step (f.).

17. The method of claim 14, wherein steps (c.) and (d.) are performed at
15 the same time.

18. The method of claim 14, wherein step (c) is performed on a stand alone jig, outside the quality control station.

20 19. The method of claim 14, wherein the workpieces are automotive crankshafts.

20. The method of claim 14, wherein the workstations all perform the same type of operation.

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21. A method of inspecting a selected workpiece during a production run in which workpieces are supplied to a plurality of workstations by an autoloader comprising a carriage movably mounted to a guidance structure, said method comprising the steps of:

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- (a.) controlling the supply of workpieces to the workstations by the autoloader in accordance with a control routine that operates in a series of cycles;
 - (b.) interrupting the control of the supply of workpieces in accordance with the control routine at the end of the then current cycle and moving the selected workpiece from a selected one of the workstations to a quality control station using the autoloader;
 - (c.) resuming the control of the supply of workpieces in accordance with the control routine;
 - 10 (d.) inspecting the selected workpiece after step (c);
 - (e.) determining whether the selected workpiece is acceptable; and
 - (f.) if the selected workpiece is acceptable, interrupting the control of the supply of workpieces in accordance with the control routine at the end of the then current cycle and moving the selected
 - 15 workpiece from the quality control station to an output area using the autoloader.

22. The method of claim 21, further comprising the step of:

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- (g.) if the selected workpiece is not acceptable, interrupting the control of the supply of workpieces in accordance with the control routine at the end of the then current cycle and moving the selected workpiece from the quality control station to another one of the workstations using the autoloader.

25 23. The method of claim 21, further comprising the step of:

- (h.) stamping the selected workpiece with a stamp indicating that the selected one of the workstations worked on the selected workpiece; and

wherein step (h.) is performed after step (f.).

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24. The method of claim 21, wherein the workstations are operable to generate and transmit call signals, and the control routine is operable to receive said call signals; and

5 wherein the control of the autoloader in accordance with the control routine causes the autoloader to supply the workpieces to the workstations based on the chronological order of the control routine's receipt of the call signals from the workstations, whereby the workstation that transmits the first received call signal is supplied with a workpiece first.

10 25. The method of claim 21, wherein the workpieces are automotive crankshafts.

26. A method of inspecting a selected workpiece during a production run through a work line comprising a plurality of zones, wherein each zone comprises
15 a plurality of workstations that perform the same type of operation, and wherein in each zone, workpieces are moved to and from the workstations by an autoloader comprising a carriage movably mounted to a guidance structure, said method comprising the steps of:

- 20 (a.) controlling a first autoloader's movement of workpieces from a first input area to the workstations in a first zone in accordance with a first control routine that operates in a series of cycles, wherein in accordance with the first control routine the selected workpiece is moved from the first input area to a first workstation in the first zone by the first autoloader;
- 25 (b.) working on the selected workpiece in the first workstation;
- (c.) interrupting the control of the supply of workpieces in accordance with the first control routine at the end of the then current cycle and moving the selected workpiece from the first workstation to a quality control station using the first autoloader;

- (d.) resuming the control of the supply of workpieces to the workstations in the first zone in accordance with the first control routine;
- (e.) inspecting the selected workpiece after step (c);
- 5 (f.) determining whether the selected workpiece is acceptable;
- (g.) if the selected workpiece is acceptable, interrupting the control of the supply of workpieces in accordance with the first control routine at the end of the then current cycle and moving the selected workpiece from the quality control station to an output area using the first autoloader;
- 10 (h.) moving the selected workpiece from the output area to a second input area in a second zone;
- (i.) controlling a second autoloader's movement of workpieces from the second input area to the workstations in the second zone in accordance with a second control routine that operates in a series of cycles, wherein in accordance with the second control routine the selected workpiece is moved from the second input area to a second workstation in the second zone by the second autoloader; and
- 15 (j.) working on the selected workpiece in the second workstation.
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27. The method of claim 26, further comprising the steps of:

- (k.) interrupting the control of the supply of workpieces in accordance with the second control routine at the end of the then current cycle and moving the selected workpiece from the second workstation to a second quality control station using the second autoloader;
- 25 (l.) resuming the control of the supply of workpieces to the workstations in the second zone in accordance with the second control routine;
- (m.) inspecting the selected workpiece after step (l.);
- 30 (n.) determining whether the selected workpiece is acceptable; and

(o.) if the selected workpiece is acceptable, interrupting the control of the supply of workpieces in accordance with the second control routine at the end of the then current cycle and moving the selected workpiece from the second quality control station to a second output area using the second autoloader.

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28. The method of claim 26, further comprising the step of:

(p.) after step (f.), if the selected workpiece is not acceptable, interrupting the control of the supply of workpieces in accordance with the first control routine at the end of the then current cycle and moving the selected workpiece from the quality control station to another workstation in the first zone using the first autoloader.

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29. The method of claim 26, further comprising the step of:

(q.) stamping the selected workpiece with a stamp indicating that the first workstation worked on the selected workpiece; and wherein step (q.) is performed after step (g.).

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30. The method of claim 26, wherein the workstations are operable to

generate and transmit call signals, and the first control routine is operable to receive said call signals from the workstations in the first zone and the second control routine is operable to receive said call signals from the workstations in the second zone; and

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wherein the control of the first autoloader in accordance with the first control routine causes the first autoloader to supply the workpieces to the workstations in the first zone based on the chronological order of the first control routine's receipt of the call signals from the workstations, whereby the workstation that transmits the first received call signal is supplied with a workpiece first; and

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wherein the control of the second autoloader in accordance with the second control routine causes the second autoloader to supply the workpieces to

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the workstations in the second zone based on the chronological order of the second control routine's receipt of the call signals from the workstations, whereby the workstation that transmits the first received call signal is supplied with a workpiece first.

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31. The method of claim 26, wherein the workpieces are automotive crankshafts.